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The Met Office Stochastic Kinetic Energy Backscatter (SKEB2) and its applications for short-, medium-range, seasonal and climate prediction

A. Arribas, W. Tennant, G. Shutts, S. Beare, R. Swinbank, and K. Williams
MetOffice, Exeter, UK (alberto.arribas@metoffice.com)

The SKEB2 scheme aims to address a missing dynamical process in numerical models:
the upscale exchange of excessively dissipated kinetic energy. This excessively dissipated energy is a consequence of errors in the dynamics (e.g. departure-point interpolation in semi-lagrangian advection schemes) and physics (e.g. not enough kinetic energy released in deep convection being transferred into balanced flows) and constitutes a substantial source of model uncertainty.

SKEB2 has been designed for its use in ensemble forecasts (the lack of adequate representation of model uncertainties has been hypothesized as the major contributor to the under-dispersion seen in ensemble prediction systems) and it will be implemented in the Met Office operational short-, medium-range and seasonal ensemble prediction systems.

Another possible seamless application of SKEB2 is its use in low-resolution models to reproduce results from high resolution models (by coarse-graining the high resolution results to calibrate and validate the scheme), therefore allowing the traceability of the results.

A description of the scheme and some preliminary results of its use at different timescales
will be presented.